

# Welcome

The meeting will begin shortly, in the meantime please,

- Keep your phone muted during the meeting.
- If you have a question/comment during the meeting type it in the chat box and it will be read and addressed during the Call to Public.
- During the Call to Public people will have the option to speak to the Council.
- If you experience any technical difficulties, please contact ADWR Help Desk at 602-771-8444 or [tickets@azwater.gov](mailto:tickets@azwater.gov)



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3. Colorado River Update – *Rachel Von Gnechten, ADWR*  
Rachel will provide an update on Colorado River hydrology
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Rebecca present the AWBA 2023 Preliminary Plan of Operation
5. Groundwater Withdrawal Fee Recommendation & WMAP
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  - b. Discuss and recommend to ADWR Director groundwater withdrawal fee rates for reporting year 2022 – *Council*
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# Tucson AMA GUAC

## September 23, 2022



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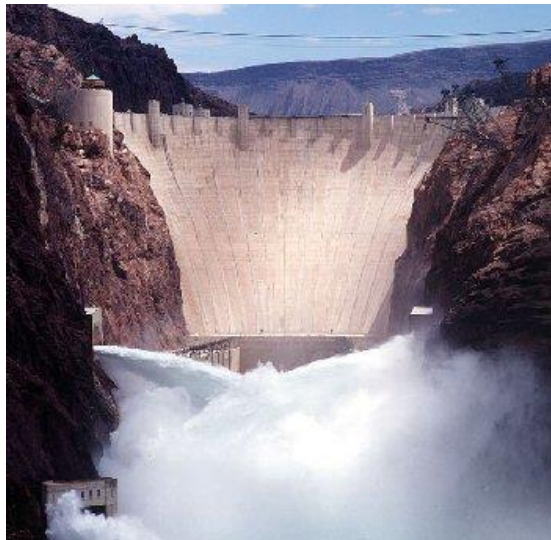
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# ***COLORADO RIVER BASIN STATUS UPDATE***

Presented to:  
**Tucson AMA**  
**Groundwater Users Advisory Council**

**September 23, 2022**



**TOTAL SYSTEM CONTENTS – 34% or 19.648 MAF**

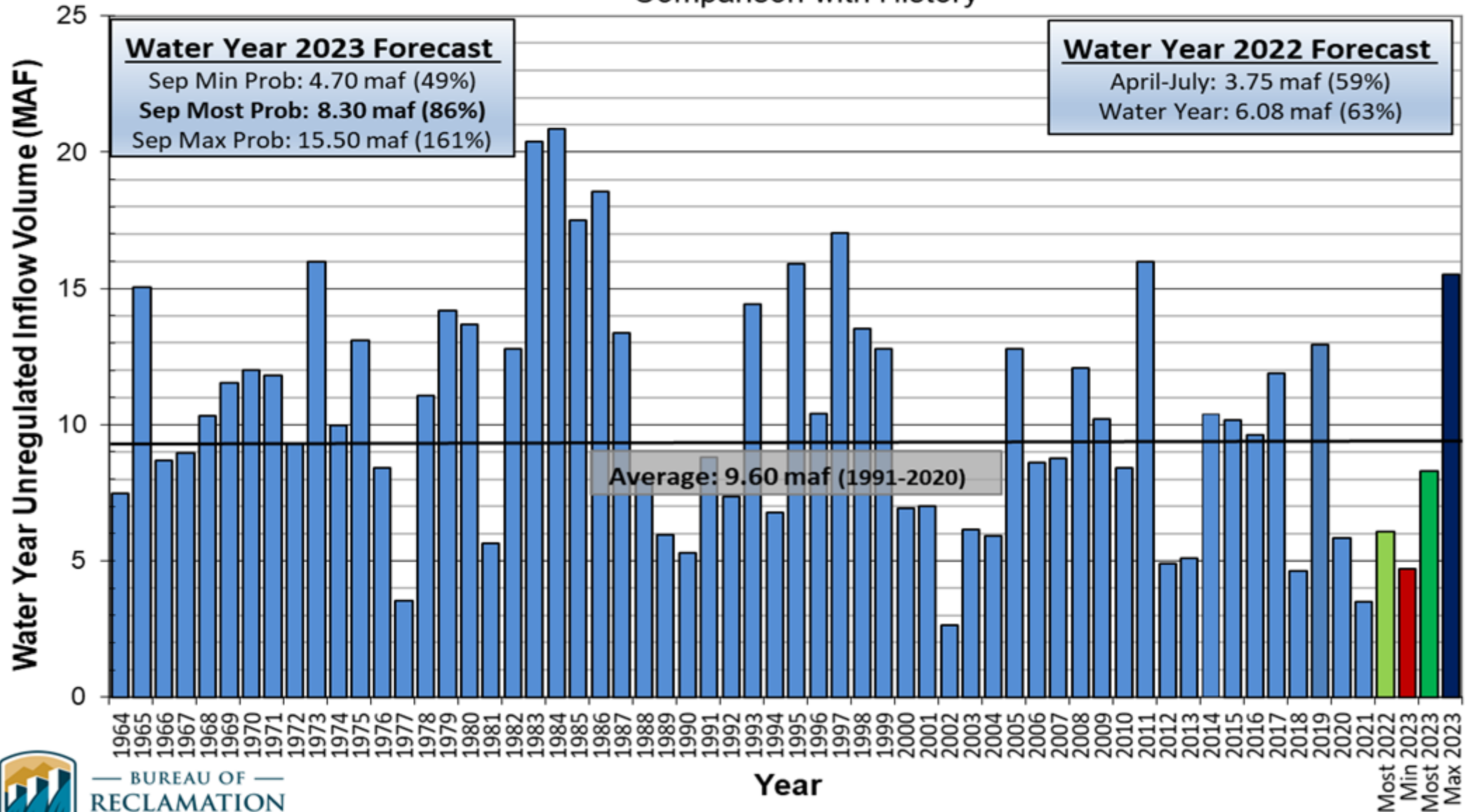
**As of September 18, 2022**



# Lake Powell Unregulated Inflow

## Water Year 2022 and 2023 Forecast *(issued September 1)*

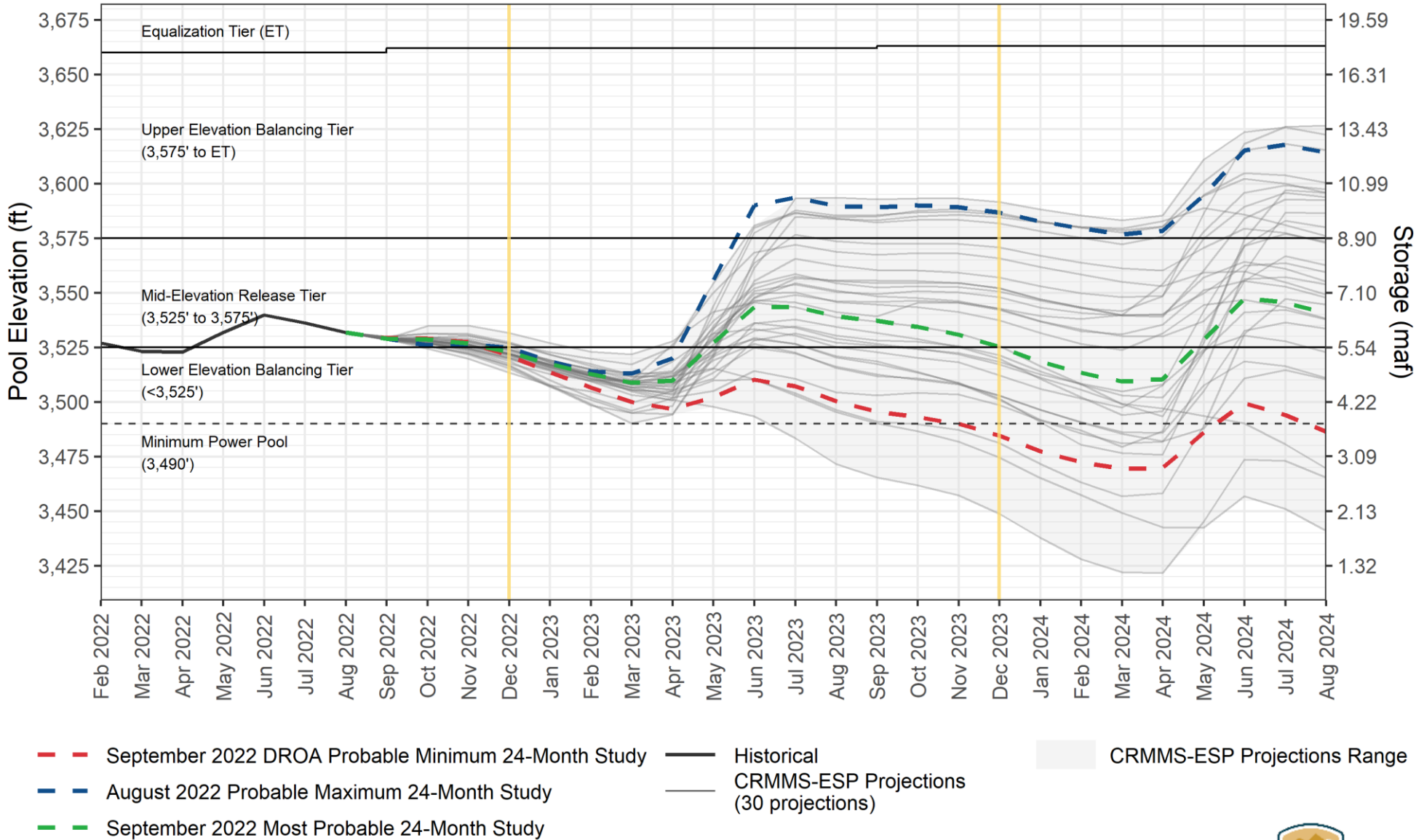
### Comparison with History



BUREAU OF  
RECLAMATION



Lake Powell End-of-Month Elevations<sup>1</sup>  
CRMMS Projections from August and September 2022



End of CY 2022 Projections

Most Probable:  
3,522.79 feet (23% full)

Probable Min:  
3,521.18 feet

End of CY 2023 Projections

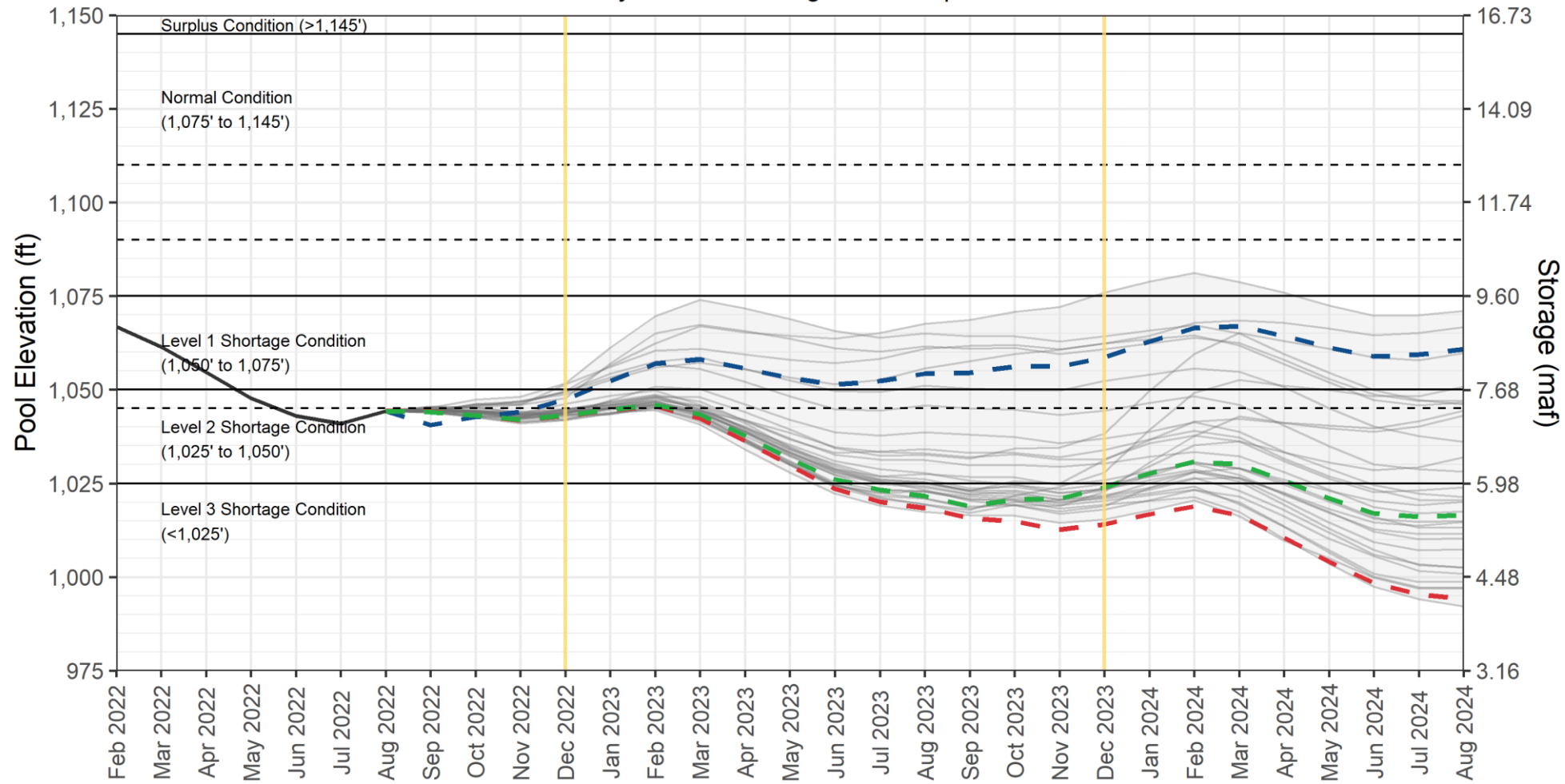
Most Probable:  
3,525.22 feet (24% full)

Probable Min:  
3,484.66 feet

<sup>1</sup> Projected Lake Powell end-of-month physical elevations from the latest CRMMS-ESP and 24-Month Study inflow scenarios.

# Lake Mead End-of-Month Elevations<sup>1</sup>

## CRMMS Projections from August and September 2022



- September 2022 DROA Probable Minimum 24-Month Study
- August 2022 Probable Maximum 24-Month Study
- September 2022 Most Probable 24-Month Study
- Historical
- CRMMS-ESP Projections (30 projections)
- CRMMS-ESP Projections Range

### End of CY 2022 Projections

**Most Probable:**  
1,043.14 feet (28% full)

**Probable Min:**  
1,043.01 feet

### End of CY 2023 Projections

**Most Probable:**  
1,023.90 feet (23% full)

**Probable Min:**  
1,014.03 feet

<sup>1</sup> Projected Lake Mead end-of-month physical elevations from the latest CRMMS-ESP and 24-Month Study inflow scenarios.

<b>Arizona 500+ Plan Activity Included in September 2022 24-Month Study (volumes in AF)</b>	<b>2021</b>	<b>2022 (Projected)</b>	<b>2023 (Projected)</b>
CAP ICS delivery offset	6,147	19,604	-18,400
Gila River Indian Community System Conservation	40,000	50,937	0
Gila River Indian Community ICS Creation	0	78,565	0
Colorado River Indian Tribes System Conservation	4,685	4,685	0
CAWCD System Conservation	0	35,506	0
YMIDD System Conservation	0	8,544	13,670
MVIDD System Conservation	0	9,592	9,592
<b>Total Arizona 500+ Plan Activity</b>	<b>50,832</b>	<b>207,433</b>	<b>4,862</b>

<b>Additional 500+ Plan Activity Included in September 2022 24-Month Study</b>	<b>2021</b>	<b>2022 (Projected)</b>	<b>2023 (Projected)</b>
MWD ICS delivery offset and/or creation	58,134	-9,200	-161,978
PVID System Conservation	12,305	50,800	58,000
SNWA ICS creation	12,832	15,000	15,000
<b>Total CA and NV 500+ Plan Included in the August 2022 24-Month Study</b>	<b>83,271</b>	<b>56,600</b>	<b>-88,978</b>
<b>Total LB 500+ Plan Activity - Modeled</b>	<b>134,103</b>	<b>264,033</b>	<b>-84,116</b>
<b>Total LB 500+ Plan Activity - Modeled (Cumulative)</b>		<b>398,136</b>	<b>314,020</b>



# Lower Colorado River Tier 2a Shortage in 2023

**On Tuesday, August 16<sup>th</sup>, Camille Touton, Commissioner of the Bureau of Reclamation, announced Lake Mead will operate in a Tier 2a Shortage Condition in 2023. Tier 2a reductions include:**

- Arizona: 592,000 acre-feet, which is approximately 21% of the state's annual apportionment
- Nevada: 25,000 acre-feet, which is 8% of the state's annual apportionment
- Mexico: 104,000 acre-feet, which is approximately 7% of the country's annual allotment
- There is no required water savings contribution for California in 2023 under this operating condition.

# 2007 Interim Guidelines, Minute 323, Lower Basin Drought Contingency Plan, and Binational Water Scarcity Contingency Plan

## Total Volumes (kaf)

Tier 1 →  
Tier 2a →  
Tier 2b →  
Tier 2c →  
Tier 2d →  
Tier 2e →  
Tier 3 →

Lake Mead Elevation (feet msl)	2007 Interim Guidelines Shortages		Minute 323 Delivery Reductions	Total Combined Reductions	DCP Water Savings Contributions			Binational Water Scarcity Contingency Plan Savings	Combined Volumes by Country <i>US: (2007 Interim Guidelines Shortages + DCP Contributions)</i> <i>Mexico: (Minute 323 Delivery Reductions + Binational Water Scarcity Contingency Plan Savings)</i>					Total Combined Volumes
	AZ	NV	Mexico	<i>Lower Basin States + Mexico</i>	AZ	NV	CA	Mexico	AZ Total	NV Total	CA Total	<i>Lower Basin States Total</i>	<i>Mexico Total</i>	<i>Lower Basin States + Mexico</i>
1,090 - 1,075	0	0	0	0	192	8	0	41	192	8	0	200	41	241
1,075 - 1050	320	13	50	383	192	8	0	30	512	21	0	533	80	613
1,050 - 1,045	400	17	70	487	192	8	0	34	592	25	0	617	104	721
1,045 - 1,040	400	17	70	487	240	10	200	76	640	27	200	867	146	1,013
1,040 - 1,035	400	17	70	487	240	10	250	84	640	27	250	917	154	1,071
1,035 - 1,030	400	17	70	487	240	10	300	92	640	27	300	967	162	1,129
1,030 - 1,025	400	17	70	487	240	10	350	101	640	27	350	1,017	171	1,188
<1,025	480	20	125	625	240	10	350	150	720	30	350	1,100	275	1,375

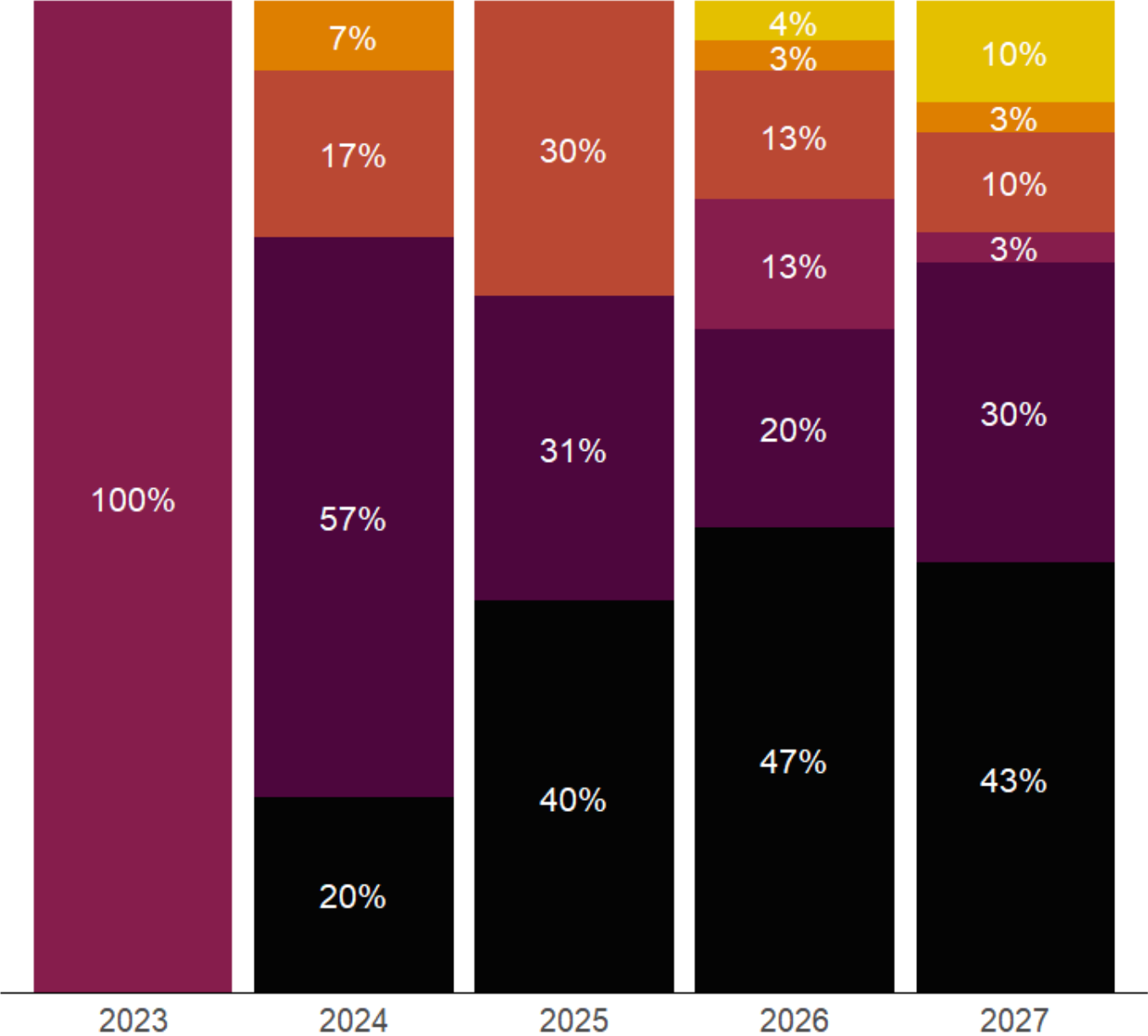
# Basin States Commit to Continue Working

- The Basin States were unable to meet the mid-August deadline set by Commissioner Touton to identify 2-4 MAF of conservation.
- The Basin States will continue to meet with the U.S. to address the challenges on the Colorado River System.
- All water users have a stake in the outcome and all need to contribute to the solution.
- The Basin States are discussing ways that additional reductions can be implemented.

\*Source: "Interior Department Announces Actions to Protect Colorado River System, Sets 2023 Operating Conditions for Lake Powell and Lake Mead." U.S. *Bureau of Reclamation*, August 16, 2022, <https://www.usbr.gov/newsroom/news-release/4294>. Press Release.

Percent of Traces with Event or System Condition - Lake Mead

August 2022 CRMMS-ESP Projections



Data Source: Bureau of Reclamation

Operating Condition	Pool Elevation	AZ Reduction & Contribution
Surplus	≥ 1,145'	0 KAF
Normal	> 1,090' and < 1,145'	0 KAF
Tier 0	> 1,075' and ≤ 1,090'	192 KAF
Tier 1	≥ 1,050' and ≤ 1,075'	512 KAF
Tier 2a	> 1,045' and < 1,050'	592 KAF
Tier 2b-e	≥ 1,025' and ≤ 1,045'	640 KAF
Tier 3	< 1,025'	720 KAF

- Notes:
1. All results computed as the percent of traces with a system condition. Percentages shown in this table may not be representative of the full range of future possibilities that could occur with different modeling assumptions.
  2. For modeling purposes, simulated years beyond 2026 assume a continuation of the 2007 Interim Guidelines, the 2019 Colorado River Basin Drought Contingency Plans, and Minute 323, including the Binational Water Scarcity Contingency Plan. With the exception of certain provisions related to ICS recovery and Upper Basin demand management, operations under these agreements are in effect through 2026. Reclamation anticipates beginning a process in early 2023 to develop operations for post-2026, and the modeling assumptions described here are subject to change for the analysis to be used in that process.



# Questions?

Rachel von Gnechten  
rvongnechten@AZWater.gov

James Heffner  
jheffner@AZWater.gov

## Additional Resources

- Arizona Reconsultation Committee: <https://new.azwater.gov/arc>
- Colorado Basin River Forecast Center: <https://www.cbrfc.noaa.gov/>
- Lower Colorado Region River Operations: <https://www.usbr.gov/lc/riverops.html>
- Upper Colorado Region River Operations: <https://www.usbr.gov/uc/water/index.html>



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# 2023 Preliminary AWBA Plan of Operation

**Rebecca Bernat**, Technical Administrator



Groundwater Users Advisory Council – Tucson AMA

Sept 23, 2022



# 2023 Preliminary Plan of Operation

## Credit Development

- **No Excess CAP water available to AWBA**
- **Goals achieved through other means**
  - Long-term Storage Credit purchases
  - Intentionally Created Surplus Firming Credits



Photo credits: NASA



# Funding for 2023 Plan of Operation

Funding Source	Estimated Funds Available		Estimated Funds Utilized		Estimated Credits (AF)	
	AWBA	CAWCD	AWBA	CAWCD	Water Storage	Developed Credits
<b>Withdrawal Fees</b>						
Phoenix AMA <sup>1</sup>	\$ 1,832,000	\$ 0	\$ 1,832,000	\$ 0	0	6,134
Tucson AMA	\$ 978,000	\$ 0	\$ 978,000	\$ 0	0	3,110
<b>Water Storage Tax<sup>2</sup></b>						
Phoenix AMA	\$ 0	\$ 3,321,000	\$ 0	\$ 3,321,000	0	10,640
Pinal AMA	\$ 0	\$ 0	\$ 0	\$ 0	0	0
Tucson AMA	\$ 0	\$ 7,818,000	\$ 0	\$ 7,818,000	0	24,900
<b>Total</b>	<b>\$ 13,949,000</b>		<b>\$ 13,949,000</b>		<b>0</b>	<b>44,784</b>

<sup>1</sup> Funds used to develop ICS Firming Credits at \$268.80/AF pursuant to AWBA's 2019 IGA with the Community. Developed credits include a 10% loss factor.

<sup>2</sup> Carryover from funds reserved by the CAWCD Board of Directors for AWBA LTSC purchases in 2021 and 2022.

# Distribution of Credits

## Firming for 2023

- Tier 2a Shortage Condition
- Tribal firming obligation for the Community
- No firming for CAP M&I or on-River (sub)contractors

**No request for Intentionally  
Created Unused Apportionment**



Photo credits: NASA

# Estimated Firming Volumes thru 2023

Objective and Location	Estimated Credits Available as of Dec 31, 2022 <sup>1</sup>	Estimated Credits Used in 2023	Estimated Credits Remaining as of Dec 31, 2023
	Acre-feet		
<b>CAP M&amp;I Firming (4-cent tax)</b>	<b>2,329,507</b>	<b>0</b>	<b>2,329,507</b>
Phoenix AMA	1,582,489	0	1,582,489
Pinal AMA	234,791	0	234,791
Tucson AMA	512,227	0	512,227
<b>On-River M&amp;I Firming (gen. fund)</b>	<b>403,830</b>	<b>0</b>	<b>403,830</b>
<b>Tribal Settlement Obligations: <sup>2</sup></b>	<b>169,281</b>	<b>15,000</b>	<b>154,281</b>
Community - 15,000 AFY	169,281	15,000	154,281
LTSCs	105,390	0	105,390
Firming Credits	37,571	15,000	22,571
ICS Firming Credits	26,320	0	26,320
WMAT - 3,750 AFY	0	0	0
Hualapai - 557.5 AFY	0	0	0
<b>Future Settlements- 4416.5 AFY</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Federal Assistance (SAWRSA)</b>	<b>34,102</b>	<b>0</b>	<b>34,102</b>
<b>Groundwater Mgmt. <sup>3</sup> (W/Fees)</b>	<b>776,265</b>	<b>0</b>	<b>776,265</b>
Phoenix AMA	251,411	0	251,411
Pinal AMA	417,706	0	417,706
Tucson AMA	107,148	0	107,148
<b>Shortage Reparations <sup>4</sup></b>	<b>109,489</b>	<b>0</b>	<b>109,489</b>
<b>Pinal Redirect Credits <sup>5</sup></b>	<b>14,125</b>	<b>0</b>	<b>14,125</b>
<b>Interstate - SNWA</b>	<b>613,846</b>	<b>0</b>	<b>613,846</b>

<sup>1</sup> Includes all credits accrued and utilized through 2022.

<sup>2</sup> WMAT enforceability date is April 30, 2025; Hualapai settlement subject to congressional approval.

<sup>3</sup> Withdrawal Fee LTSCs may be used for CAP M&I firming and/or Tribal settlement obligations if needed.

<sup>4</sup> LTSCs accrued pursuant to Arizona-Nevada Shortage-Sharing Agreement executed in 2007.

<sup>5</sup> Credits accrued from water provided to Pinal AMA GSFs at full cost to the GSF operators.

# Questions?

Email: [voconnell@azwater.gov](mailto:voconnell@azwater.gov)  
[rbernata@azwater.gov](mailto:rbernata@azwater.gov)

Website: <https://waterbank.az.gov/>



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# AZ Project WET

ADWR - GUAC Meeting  
9/23/2022



THE UNIVERSITY OF ARIZONA

**Cooperative Extension**

Arizona Project WET

# IGA - Scope of Work (September 2021- Present)


---

- ❖ Teacher Professional Development
- ❖ Direct Student Outreach Programs
  - Sweetwater Wetlands
  - Groundwater Flow Model Presentations
  - Water Audits
  - Investigation Days
- ❖ Arizona Water Festivals – Marana, Amphi, Sahuarita
- ❖ Equipment Loan





# Online ROV Academy

- ❖ 15 Teams registered (Family)
  - Student-Parent
  - Siblings
  - Adult 4-H leaders
- ❖ 9 Week Course
  - Canvas LMS (Learning Management System)
  - 13 Live Zoom Sessions
  - Video Demonstrations & Audio enhanced presentations




THE UNIVERSITY OF ARIZONA  
Cooperative Extension






**4-H STEM YOUNiversity**  
**Online Underwater Robotics Camp Spring 2021**  
Open to youth, teachers, educators and 4-H Volunteers  
March 3 - April 28, 2021  
Remote Competition May 1-15  
[Learn More](#)


**Arizona Teachers, Educators, 4-H Volunteers**  


Would you like to learn about underwater robotics alongside your students or club members after attending this camp? We want you to make a difference become a STEM Counselor! Teachers and Educators will need to become Certified 4-H Volunteers, begin the process with your County Agent.  
[Register Here to start the process](#)


**6th-12th Grade Students**  
Do you enjoy hands-on activities, learning about engineering design process, circuitry and soldering? Then this project is right for you!  
[Register a Team Here](#)



**Registration Closes February 24**



THE UNIVERSITY OF ARIZONA  
Cooperative Extension  
Arizona Project WET



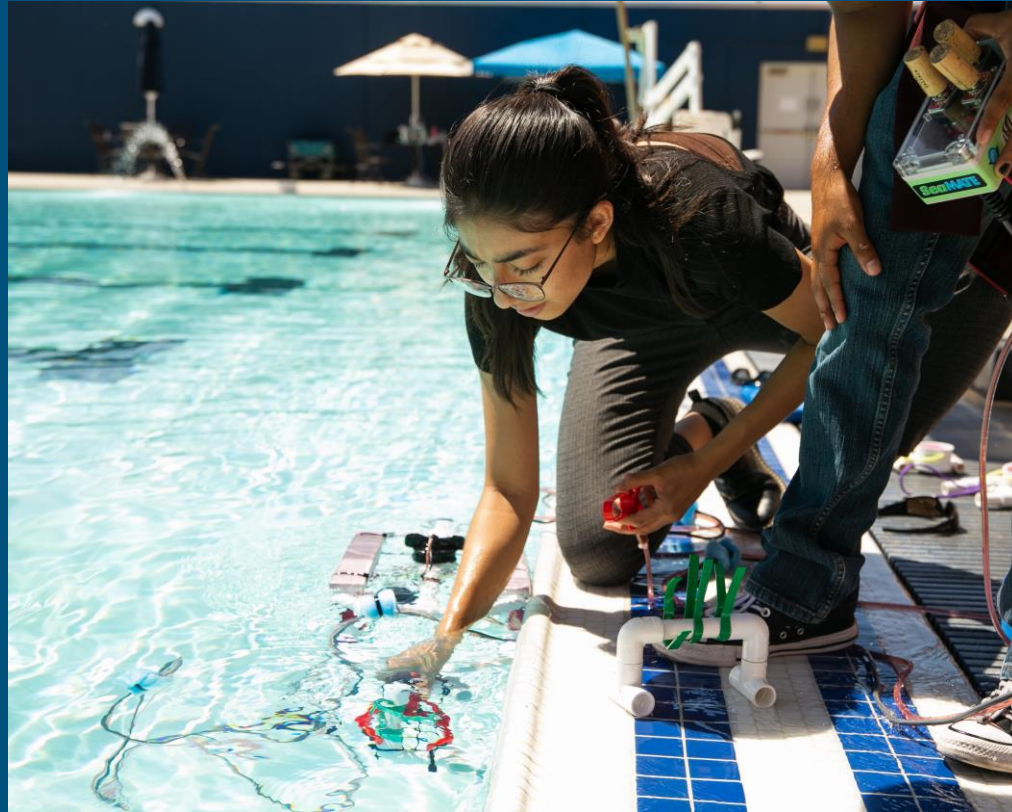
MATE II

20 Teams Maximum Questions?  
[Contact Betsy Wilkening](#)  
or  
[Jerry Lopez](#)

# ROV Competition

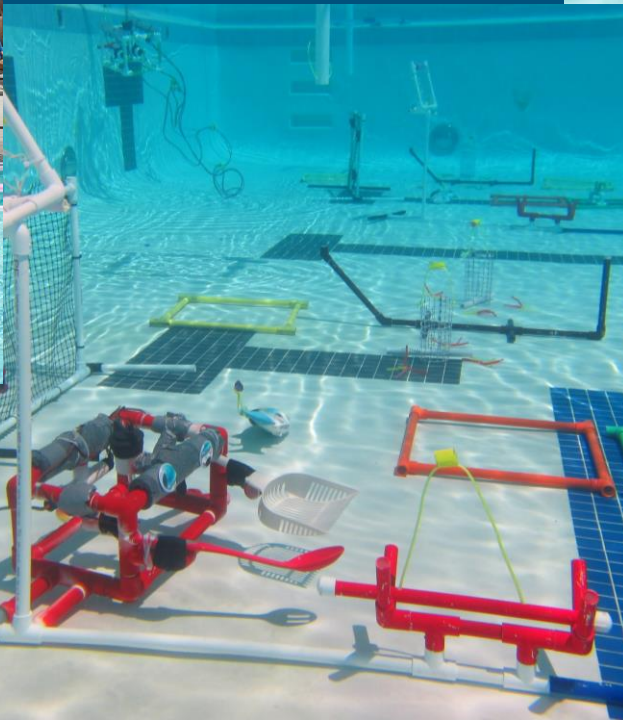
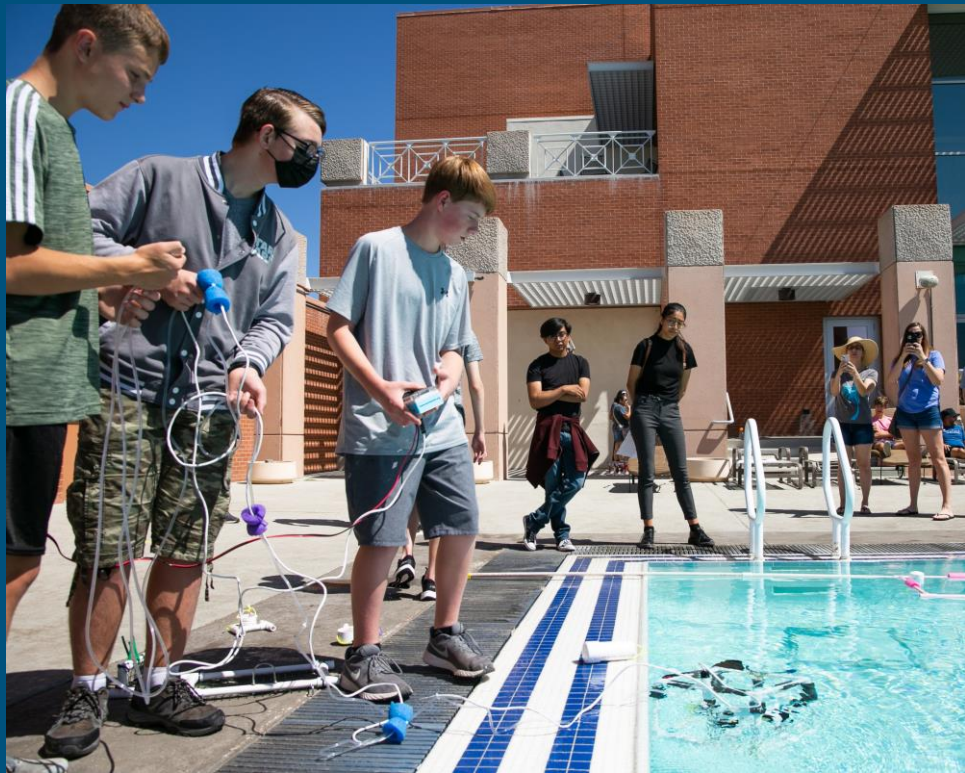
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- ❖ 8 teams
- ❖ 3 schools
- ❖ 4-H Sibling teams





# Regional Competition





# Direct Student Outreach Water Conservation Investigation

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9 Schools

33 Classes

Over 600 Students

180 Investigators report a projected 1.56 Million Gallons per year of water conserved



# Direct Student Outreach: Sweetwater Wetlands

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20 Schools

48 Classes

Over 900 Students

# AZ Water Festivals – Marana, Sahuarita, Tucson (Amphi SD)

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Marana – 9 Schools, 39 Teachers, 889 Students

Sahuarita – 10 Schools, 21 Teachers, 481 Students

Tucson (Amphi) - 9 Schools, 16 Teachers, 372 Students

## Come Join Us! March 29<sup>th</sup>, Crossroads Park



# 2022-23 School Year

- Increased Green Stormwater Infrastructure education – passive RWH
- Focus on expanding into rural areas of the AMA (Vail, Sahuarita, Three Points, Sells) with appropriate programming.



# For 2022-23

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Arizona Project WET requests a renewal for \$45,000 for a one year contract as we return to schools and field experiences.



# Questions?

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Josh Ruddick [jruddick@arizona.edu](mailto:jruddick@arizona.edu)

Holly Thomas-Hilburn [hhilburn@arizona.edu](mailto:hhilburn@arizona.edu)

# Meeting Agenda

1. Call to Order – Welcome & Introductions – *Chair*
2. Meeting Logistics – *Kennedy Shepard, ADWR*
3. Colorado River Update – *Rachel Von Gnechten, ADWR*  
Rachel will provide an update on Colorado River hydrology
4. Arizona Water Bank Authority Preliminary 2023 Plan of Operation –*Rebecca Bernat, AWBA*  
Rebecca present the AWBA 2023 Preliminary Plan of Operation
5. Groundwater Withdrawal Fee Recommendation & WMAP
  - a. Review withdrawal fee rates and money collected in past five years, WMAP projects, and remaining balance – *Melissa Sikes, ADWR*
  - b. Discuss and recommend to ADWR Director groundwater withdrawal fee rates for reporting year 2022 – *Council*
6. WMAP Project Update and Funding Renewal Request – Renewal of Contract # 2021-3143: Holly Hilburn-Thomas, Arizona Project Wet  
The Council will hear an update and discuss a request for a renewal of WMAP funding. Based upon such discussion, the Council may vote to make a recommendation to the director with respect to the proposed action.
7. WMAP Project Funding Request – *Pima County Zoning Code Landscaping Ordinance & Landscape Design Manual Update, Paula Randolph, Babbitt Center*  
The Council will hear an update and discuss a request for a renewal of WMAP funding. Based upon such discussion, the Council may vote to make a recommendation to the director with respect to the proposed action.
8. Overdraft and Safe-Yield in the Tucson AMA – *Amanda Long*  
Amanda will present on the status of safe-yield in the Tucson AMA using the method described in a recently published report assessing each AMA's progress towards its management goal.
9. Statewide Planning Updates– *John Riggins, ADWR*  
John will discuss upcoming supply and demand assessments and provide the council with an update on GWAICC activities and progress.
10. Call to the Council – *Council*
11. Call to the Public – *Chair*
12. Adjournment – *Chair*







# BABBITT CENTER

## FOR LAND AND WATER POLICY

*A Center of the Lincoln Institute of Land Policy*

**Paula Randolph**  
Associate Director





# About the Babbitt Center for Land and Water Policy

## Mission

The Babbitt Center for Land and Water Policy, a center of the Lincoln Institute of Land Policy, seeks to advance the integration of land and water management to meet the current and future water needs of Colorado River Basin communities, economies, and the environment. We develop tools and best practices to guide decisions through research, training, and partnerships for sustainable management of land and water resources in the Colorado Basin and beyond.

## Babbitt Center Approaches



RESEARCH



PARTNER



INNOVATE



EDUCATE

# ARIZONA GROWING WATER SMART

INTEGRATING WATER AND LAND USE PLANNING



**BABBITT CENTER**  
FOR LAND AND WATER POLICY

*A Center of the Lincoln Institute of Land Policy*



**SONORAN**  
INSTITUTE





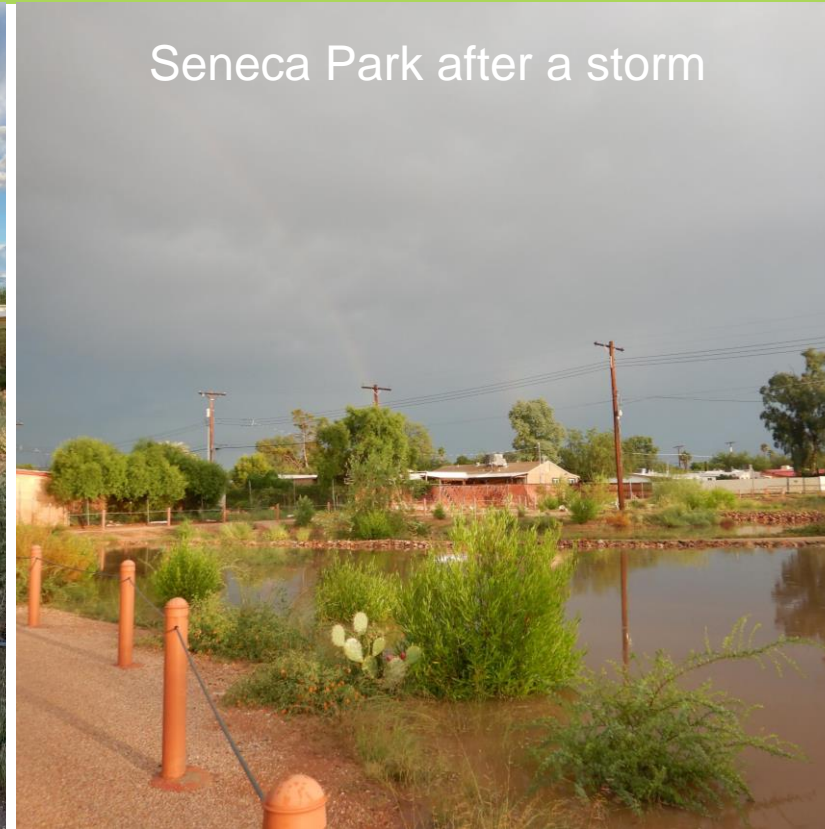
## Why Is Land Important When Looking At Water Scarcity?

- Land use decisions are made every day that shape our water future
  - Development influences water demand
  - Need to plan for development with water constraints in mind
- Coordination of land and water use decisions is critical if we are to meet the current and future water needs of our people, economy, and environment





BABBITT CENTER



## Previous Successful Pima County Landscape Projects

Focus: Water Management

Richey Basin

Seneca Neighborhood Park and  
Drainage Basin



# Pima County WMAP Request

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## Update County Landscape Code and Design Manual

September 2022 – May 2023

WMAP grant request: \$6,940

Total Project Budget: \$16,940



## Benefits for Tucson AMA

Incorporate effective water management in new code

Reduce outdoor water usage

Code will apply to new development projects entitled by Pima County DSD





Paula Randolph

[prandolph@lincolninst.edu](mailto:prandolph@lincolninst.edu)

Mark Holden

[Mark.Holden@pima.gov](mailto:Mark.Holden@pima.gov)



**BABBITT CENTER**  
FOR LAND AND WATER POLICY

*A Center of the Lincoln Institute of Land Policy*



**LINCOLN INSTITUTE**  
OF LAND POLICY



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12. Adjournment – *Chair*







# Overdraft and Safe-Yield in the Tucson AMA

Tucson AMA GUAC Meeting  
September 23, 2022  
Amanda Long  
Associate Water Analyst

# Agenda

- \* Safe-Yield Discussions in the Management Plans
- \* Fifth Management Plans Work Group: Safe-Yield Technical Subgroup
  - Safe-Yield vs. Overdraft
  - Annual Overdraft Calculation
  - Long-Term Overdraft Calculation
  - Achieve & Maintain
  - Communication Strategy
- \* Overdraft Data Dashboard
- \* Status of Safe-Yield in the Tucson AMA

## OVERDRAFT, SAFE-YIELD, AND THE MANAGEMENT GOALS OF ARIZONA'S ACTIVE MANAGEMENT AREAS

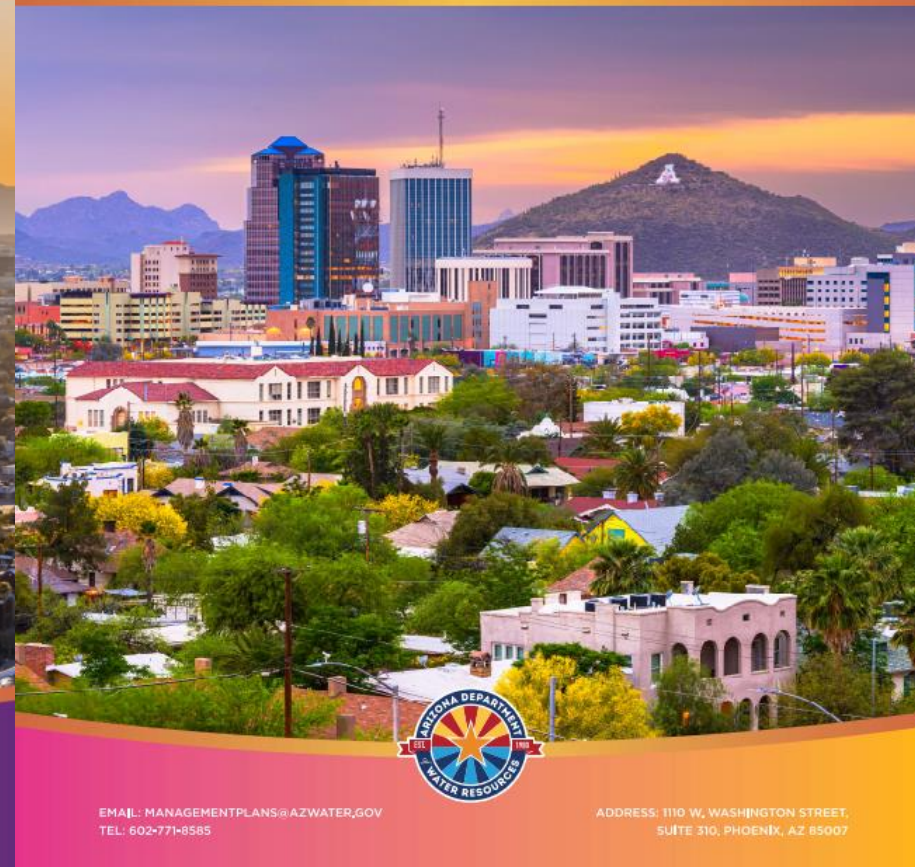
JANUARY 2022



Report available at:  
[https://new.azwater.gov/sites/default/files/media/ManagementGoalsReport2022\\_o.pdf](https://new.azwater.gov/sites/default/files/media/ManagementGoalsReport2022_o.pdf)

## FIFTH MANAGEMENT PLAN TUCSON ACTIVE MANAGEMENT AREA

2020-2025



<https://new.azwater.gov/sites/default/files/media/TAMA5MP.pdf>

# Management Goals (A.R.S. § 45-562)

## **Safe-yield:**

*“A groundwater management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”*

*(A.R.S. § 45-561(12))*

## **Tucson, Phoenix, and Prescott AMAs:**

Safe-yield by the year 2025

## **Pinal AMA:**

To allow development of non-irrigation uses and to preserve existing agricultural economies in the AMA for as long as feasible, consistent with the necessity to preserve future water supplies for non-irrigation uses.

## **Santa Cruz AMA:**

To maintain a safe-yield condition in the AMA and to prevent local water tables from experiencing long term declines





# MANAGEMENT PLANS WORK GROUP

- \* ADWR-led stakeholder forum for the development of the 5th Management Plans
- \* Meetings held 2019-2021
- \* Five subgroups created
  - \* Agricultural
  - \* Municipal
  - \* Industrial
  - \* Turf
  - \* Safe-Yield Technical
- \* Safe-Yield Technical Subgroup Goals
  - \* Clear, consistent methodology for assessing safe-yield or the management goal in each AMA
  - \* A method to communicate the status of safe-yield to the public, regulated community, and water professionals

# Safe-Yield

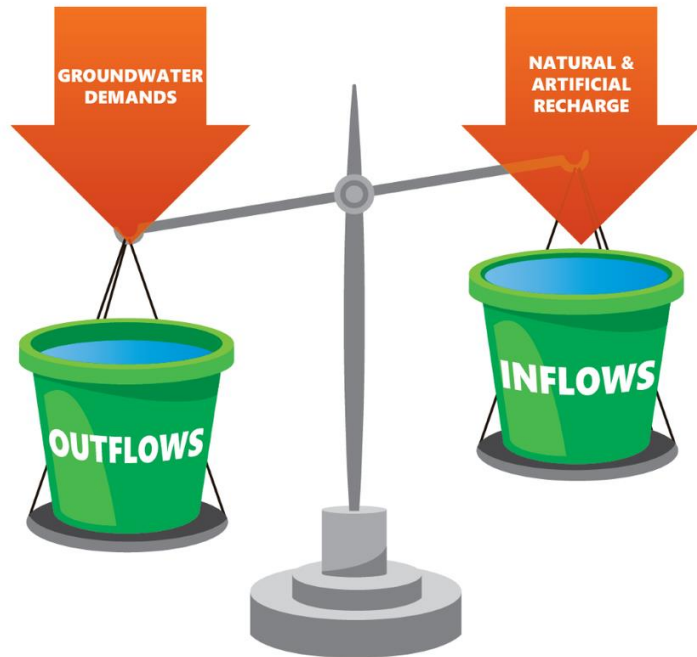
## **Safe-yield:**

“A groundwater management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”  
(A.R.S. § 45-561(12))

- \* Statutory definition with 3 parts:
  - \* Annual Calculation
  - \* Long-term Balance
  - \* Achieve & Maintain Balance
- \* AMA Level, all sectors play a role
- \* A groundwater focused budget comprised of paper and wet water components
  - \* Legal groundwater vs. water that is under the ground
- \* Attempts to achieve
- \* Overdraft ≠ Safe-yield
  - \* Overdraft is one component of Safe-yield



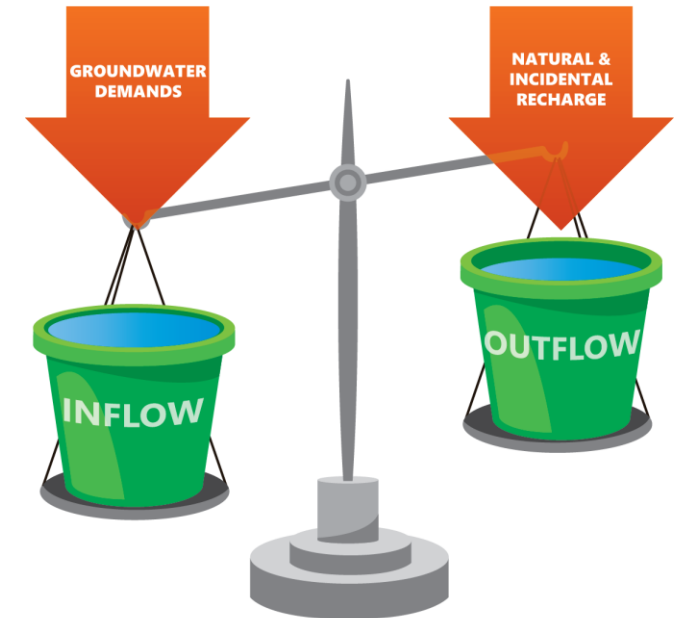
# Overdraft Calculation



## OVERDRAFT

Outflows from Aquifer > Inflows to Aquifer

- \* Quantitative water budget calculation comparing inflows to and outflows from the aquifer
- \* Annual or long-term timeframe
- \* Groundwater focused
- \* AMA-level
- \* One component of safe-yield

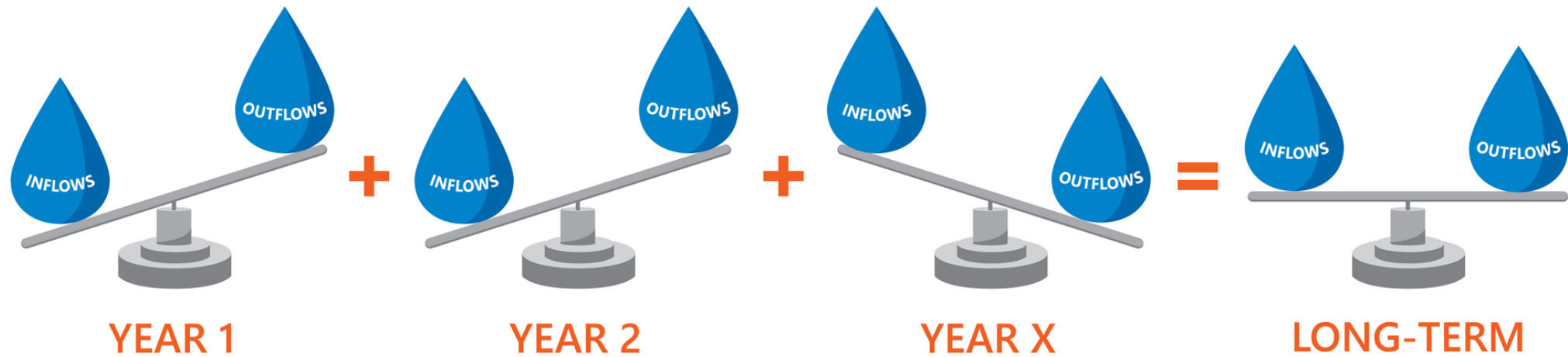


## BALANCE

Inflows to Aquifer  $\geq$  Outflows from Aquifer

# Safe-Yield

**ACHIEVE AND MAINTAIN LONG-TERM BALANCE = SAFE-YIELD!**



- \* **Safe- Yield:**

- \* No overdraft in the long-term (long-term balance of inflows and outflows) & maintenance thereafter
- \* Quantitative and Qualitative
- \* Considers:
  - \* Annual inflows and outflows (Annual Overdraft Calculation, Quantitative)
  - \* Long-term trends of annual inflows and outflows (Long-Term Overdraft Calculation, Quantitative)
  - \* Other factors that may allow or prevent maintenance of a long-term balance (Qualitative)

# Safe-Yield Technical Subgroup

<https://new.azwater.gov/5MP>

## \* Goals

1. Assess each component of annual overdraft and develop a consistent method to calculate annual overdraft (*Annual Overdraft Calculation*)
2. Develop a general and consistent approach to assessing overdraft in the long-term (*Long-Term Overdraft Calculation*)
3. Develop a communication strategy that considers qualitative and quantitative factors to provide status of the management goal in each AMA (*Achieve & Therefore Maintain*)

## \* Development dashboard and concept/proposal summaries:

<https://new.azwater.gov/5MP/plans-concepts>

## **Safe-yield:**

“A groundwater management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”  
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<https://new.azwater.gov/5MP>

## \* Goals

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## Safe-yield:

“A groundwater management goal which attempts to *achieve and thereafter maintain a long-term* balance between the *annual* amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”  
(A.R.S. § 45-561(12))

# Annual Calculation – Data Sources

Source	Inflows	Outflows
Natural	Groundwater Inflow	Groundwater Outflow
	Streambed Recharge	Riparian Demand
	Mountain-front Recharge	
Artificial	Incidental Recharge: Agricultural Municipal Industrial	Sector Demands: Agricultural Municipal Industrial Indian
	Canal Seepage	
	Cut to the Aquifer	Remediated Groundwater
	CAGRD Replenishment	Poor Quality Groundwater

**Annual Overdraft Calculation:**  

$$\text{Inflows} - \text{Outflows} = \text{Overdraft}$$
 or  

$$\text{Inflows} - \text{Outflows} = \text{Balance}$$

Items highlighted in blue are outputs of ADWR's regional groundwater models.

Items highlighted in gray are compiled from AMA Annual Reports.

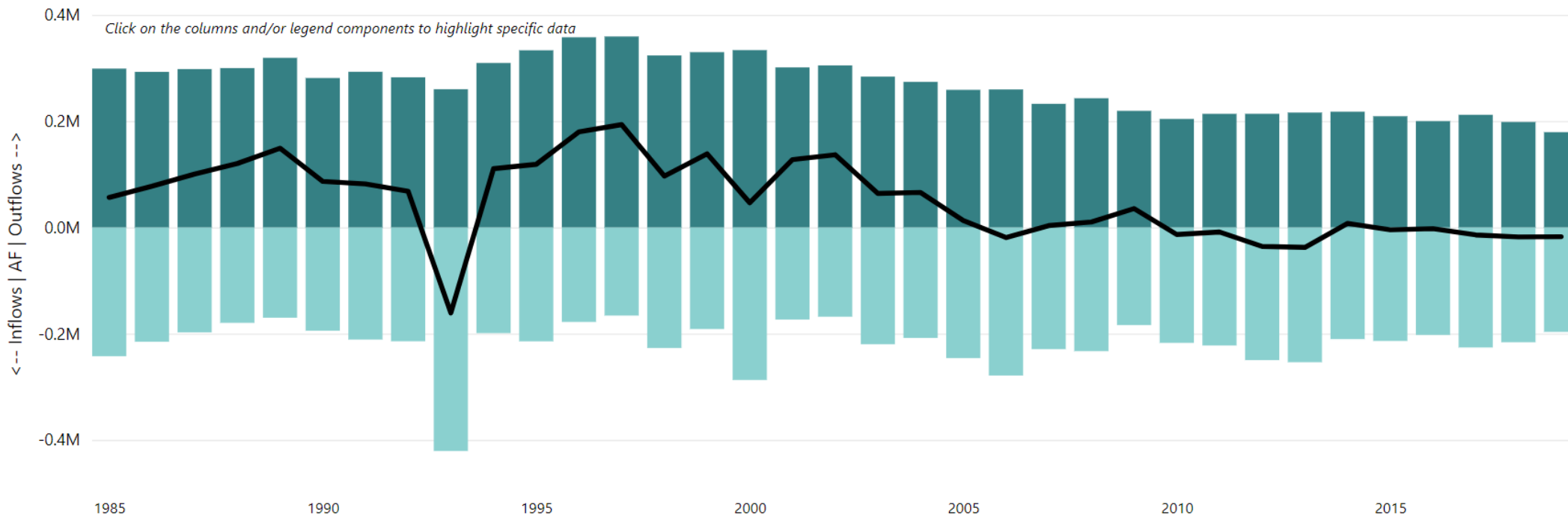


# Overdraft Data Dashboard: Annual

## OVERDRAFT DATA DASHBOARD: Annual Overdraft

For more information, click here for the Safe-Yield Report

● Inflow ● Outflow ● Overdraft



Show Components

Hide Components

YEAR

1985

2019

AMA

- ☐ Phoenix
- ☐ Pinal
- ☐ Prescott
- ☐ Santa Cruz
- ☒ Tucson

Hold down "Ctrl" to select multiple AMAs

### SAFE-YIELD INFLOWS:

Groundwater Inflow (Natural)\*  
 Streambed Recharge (Natural)\*  
 Mountain-front Recharge (Natural)\*  
 Agricultural Incidental Recharge (Artificial)  
 Municipal Incidental Recharge (Artificial)  
 Industrial Incidental Recharge (Artificial)  
 Canal Seepage (Artificial)  
 Cut to the Aquifer (Artificial)  
 CAGR Replenishment (Artificial)

### SAFE-YIELD OUTFLOWS:

Groundwater Outflow (Natural)\*  
 Riparian Demand (Natural)\*  
 Agricultural Demand (Artificial)  
 Municipal Demand (Artificial)  
 Industrial Demand (Artificial)  
 Indian Demand (Artificial)



# Safe-Yield Technical Subgroup

<https://new.azwater.gov/5MP>

## \* Goals

1. Assess each component of annual overdraft and develop a consistent method to calculate annual overdraft (*Annual Overdraft Calculation*)
2. Develop a general and consistent approach to assessing overdraft in the long-term (*Long-Term Overdraft Calculation*)
3. Develop a communication strategy that considers qualitative and quantitative factors to provide status of the management goal in each AMA (*Achieve & Therefore Maintain*)

## \* Development dashboard and concept/proposal summaries:

<https://new.azwater.gov/5MP/plans-concepts>

## Safe-yield:

“A groundwater management goal which attempts to *achieve and thereafter maintain* a *long-term* balance between the *annual* amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”

(A.R.S. § 45-561(12))

# Overdraft Data Dashboard : Long-Term

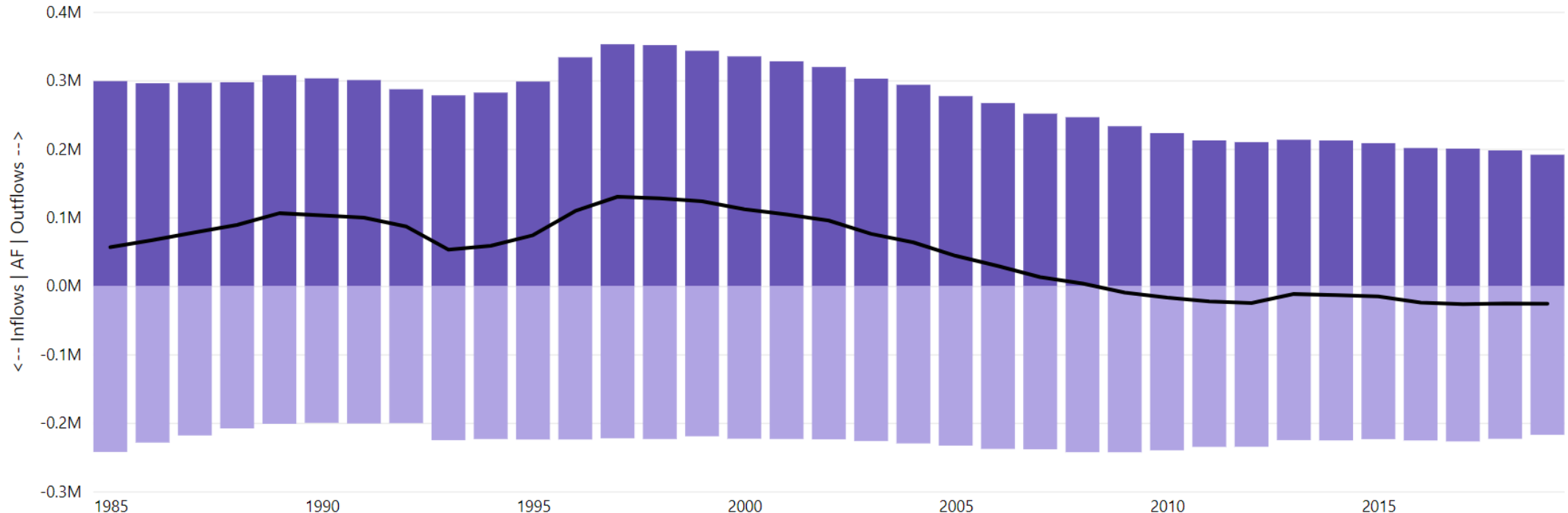
## OVERDRAFT DATA DASHBOARD: Long-Term Overdraft

The long-term method uses a 3-year rolling average of artificial components and a 20-year rolling average of natural components.

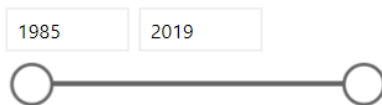
For more information, click here for the Safe-Yield Report



● Inflows ● Outflows ● Overdraft Click on the columns and/or legend components to highlight specific data



YEAR



AMA

- ☐ Phoenix
- ☐ Pinal
- ☐ Prescott
- ☐ Santa Cruz
- ☒ Tucson

Hold down "Ctrl" to select multiple AMAs, Sectors, and/or Components

### Long-Term Balance Calculation:

- 3 year rolling average of artificial components
- 20 year rolling average of natural components

<https://new.azwater.gov/ama/ama-data>

# Safe-Yield Technical Subgroup

<https://new.azwater.gov/5MP>

## \* Goals

1. Assess each component of annual overdraft and develop a consistent method to calculate annual overdraft (*Annual Overdraft Calculation*)
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## Safe-yield:

“A groundwater management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”

(A.R.S. § 45-561(12))



# Achieve and Thereafter Maintain

## **Safe-yield:**

*“A groundwater management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”*

*(A.R.S. § 45-561(12))*

## **Factors affecting the maintenance of safe-yield**

- \* Shortage of Colorado River water to offset groundwater pumping

# Safe-Yield Technical Subgroup

<https://new.azwater.gov/5MP>

## \* Goals

1. Assess each component of annual overdraft and develop a consistent method to calculate annual overdraft (*Annual Overdraft Calculation*)
2. Develop a general and consistent approach to assessing overdraft in the long-term (*Long-Term Overdraft Calculation*)
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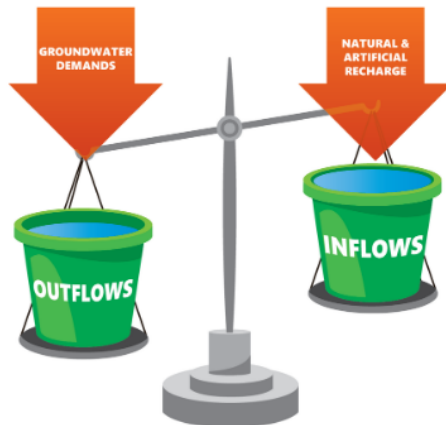
# Communication Strategy: General Public

## OVERDRAFT DATA DASHBOARD: Status of Management Goal

For more information, click here for the Safe-Yield Report

### Overdraft

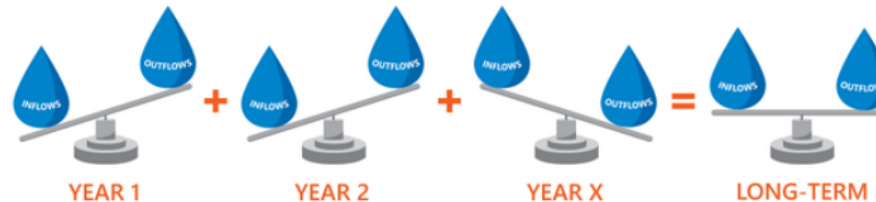
An annual or long-term AMA-level condition where outflows from the aquifer are greater than inflows to the aquifer. Annual or long-term balance exists when there is no overdraft in an AMA.



### Safe-yield

An AMA level condition where inflows and outflows are balanced and maintained in the long-term. Safe-yield is the management goal for the Prescott, Phoenix, and Tucson AMA. Safe-yield is also a portion of Santa Cruz management goal.

**ACHIEVE AND MAINTAIN LONG-TERM BALANCE = SAFE-YIELD!**



### Status of the Management Goal

At or around safe-yield, however under Colorado River shortage conditions, it may be unlikely safe-yield is maintained.

#### AMA

- ☐ Phoenix
- ☐ Pinal
- ☐ Prescott
- ☐ Santa Cruz
- ☒ Tucson

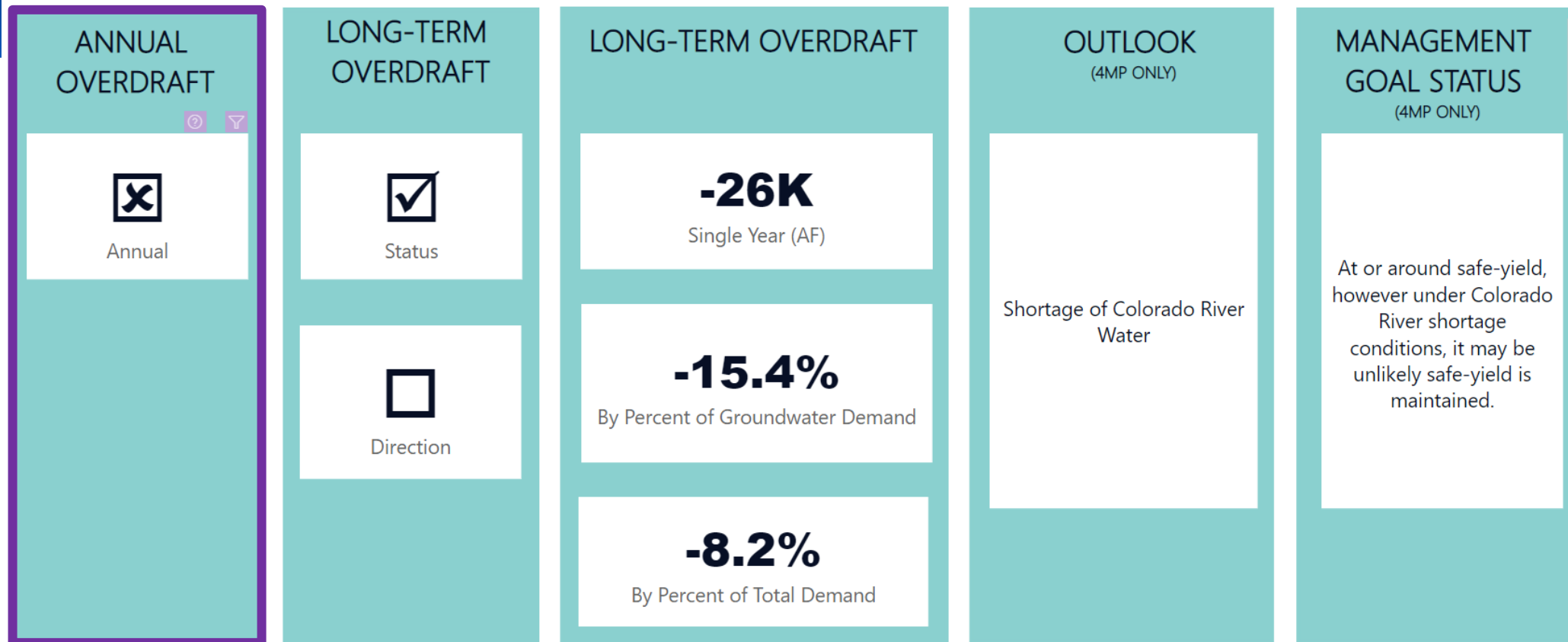
Year of Management Goal Assessment:

**2019**

# Communication Strategy: Technical

## OVERDRAFT DATA DASHBOARD: Management Goal Assessment

For more information, click here for the Safe-Yield Report



### AMA

- ☐ Phoenix
- ☐ Pinal
- ☐ Prescott
- ☐ Santa Cruz
- ☒ Tucson

### Management Period


- ☐ 1MP (1985-1989)
- ☐ 2MP (1990-1999)
- ☐ 3MP (2000-2009)
- ☒ 4MP (2010-Present)

**2019**

Last Year of Long-Term  
Analysis

### METRIC DEFINITIONS:

For the definition of the metric:

1. Hover over the white metric box and this symbol 
2. See Section 7 of the Safe-Yield Report



Annual  
Overdraft  
Calculation,  
Qualitative



# Communication Strategy: Technical

## OVERDRAFT DATA DASHBOARD: Management Goal Assessment

For more information, click here for the Safe-Yield Report

### ANNUAL OVERDRAFT



Annual

### LONG-TERM OVERDRAFT



Status



Direction

### LONG-TERM OVERDRAFT

**-26K**

Single Year (AF)

**-15.4%**

By Percent of Groundwater Demand

**-8.2%**

By Percent of Total Demand

### OUTLOOK (4MP ONLY)

Shortage of Colorado River  
Water

### MANAGEMENT GOAL STATUS (4MP ONLY)

At or around safe-yield,  
however under Colorado  
River shortage  
conditions, it may be  
unlikely safe-yield is  
maintained.

#### AMA

- ☐ Phoenix
- ☐ Pinal
- ☐ Prescott
- ☐ Santa Cruz
- ☒ Tucson

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- ☐ 1MP (1985-1989)
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**2019**

Last Year of Long-Term  
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<https://new.azwater.gov/ama/ama-data>

Long-Term  
Overdraft  
Calculation,  
Qualitative

# Communication Strategy: Technical

## OVERDRAFT DATA DASHBOARD: Management Goal Assessment

For more information, click here for the Safe-Yield Report

### ANNUAL OVERDRAFT



Annual

### LONG-TERM OVERDRAFT



Status



Direction

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**2019**

Last Year of Long-Term  
Analysis

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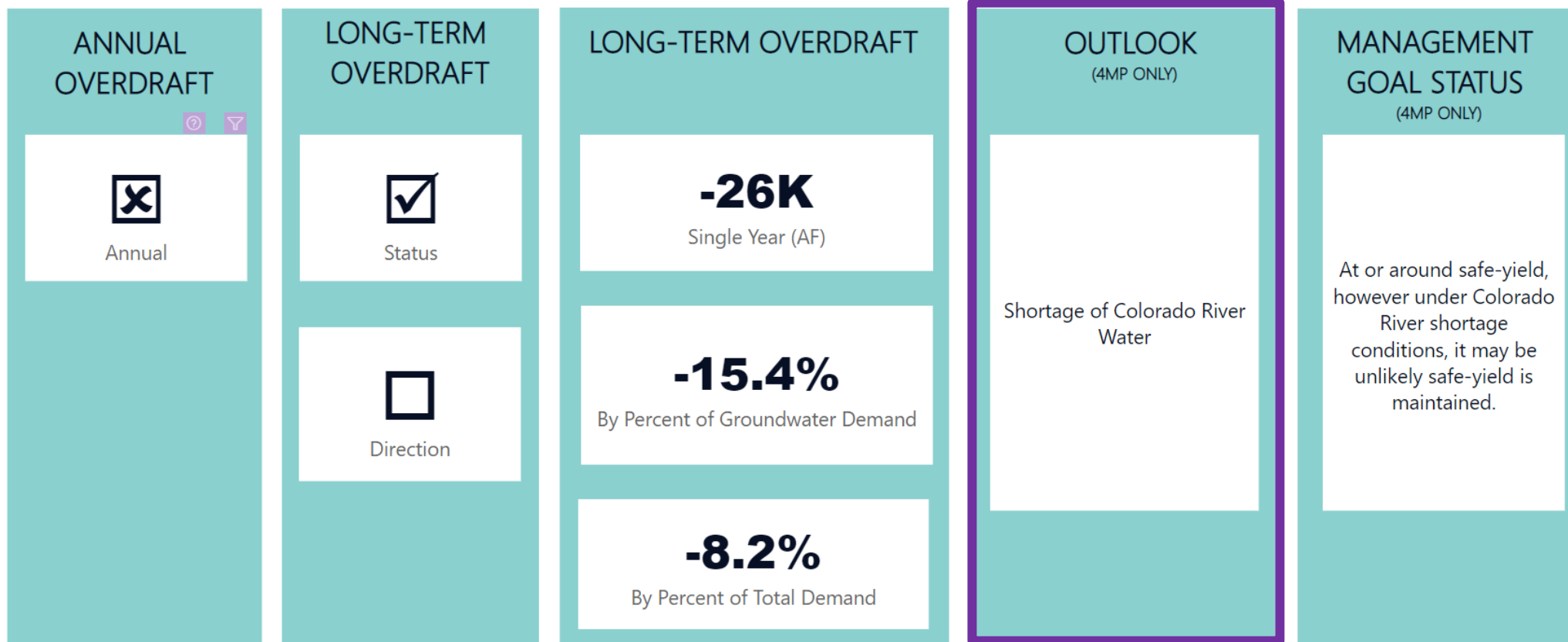


Long-Term  
Overdraft  
Calculation,  
Quantitative

# Communication Strategy: Technical

## OVERDRAFT DATA DASHBOARD: Management Goal Assessment

For more information, click here for the Safe-Yield Report



### AMA

- ☐ Phoenix
- ☐ Pinal
- ☐ Prescott
- ☐ Santa Cruz
- ☒ Tucson

### Management Period


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- ☐ 2MP (1990-1999)
- ☐ 3MP (2000-2009)
- ☒ 4MP (2010-Present)

**2019**

Last Year of Long-Term  
Analysis

### METRIC DEFINITIONS:

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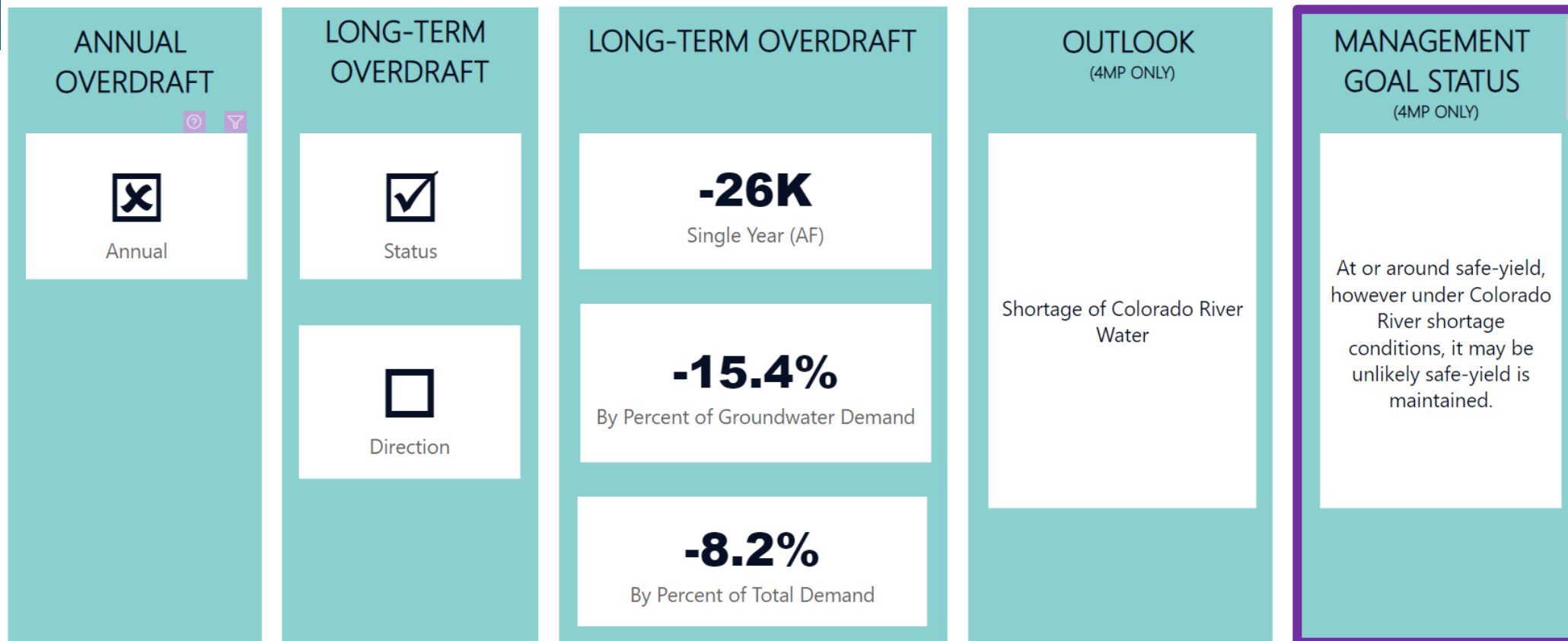


Factors  
affecting  
Achievement &  
Maintenance  
of Safe-Yield,  
Qualitative

# Communication Strategy: Technical

## OVERDRAFT DATA DASHBOARD: Management Goal Assessment

For more information, click here for the Safe-Yield Report



### AMA

- ☐ Phoenix
- ☐ Pinal
- ☐ Prescott
- ☐ Santa Cruz
- ☒ Tucson

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**2019**

Last Year of Long-Term  
Analysis

### METRIC DEFINITIONS:

For the definition of the metric:

1. Hover over the white metric box and this symbol 
2. See Section 7 of the Safe-Yield Report



Status of  
Safe-Yield,  
Qualitative



5TH MANAGEMENT PLANS CONCEPTS

Concepts and stakeholder comments related to the development of the 5MP conservation programs are available below. The draft 5MP for each AMA can be found on the [Management Plans page](#) under the "Fifth" dropdown.

- AGRICULTURAL SUBGROUP
- INDUSTRIAL SUBGROUP
- TURF BREAKOUT GROUP
- MUNICIPAL SUBGROUP
- SAFE-YIELD TECHNICAL SUBGROUP

- Concept: Annual Calculation and Long-Term Analysis of Safe-Yield
- Concept: Methods of Communicating Safe-Yield

- RECHARGE SUBGROUP
- OTHER TOPICS

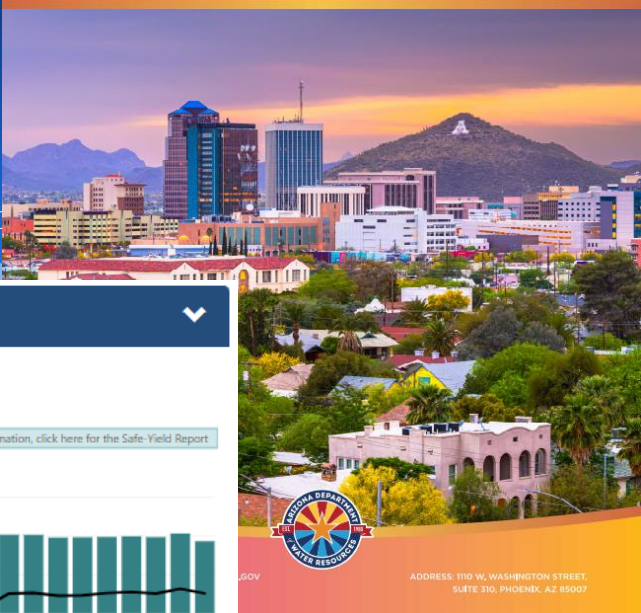
5th Management Plans Workgroup  
<https://new.azwater.gov/5MP/plans-concepts>

# Resources

FIFTH  
MANAGEMENT PLAN


TUCSON ACTIVE MANAGEMENT AREA

2020-2025



OVERDRAFT, SAFE-YIELD,  
AND THE MANAGEMENT GOALS OF  
ARIZONA'S ACTIVE MANAGEMENT AREAS

JANUARY 2022

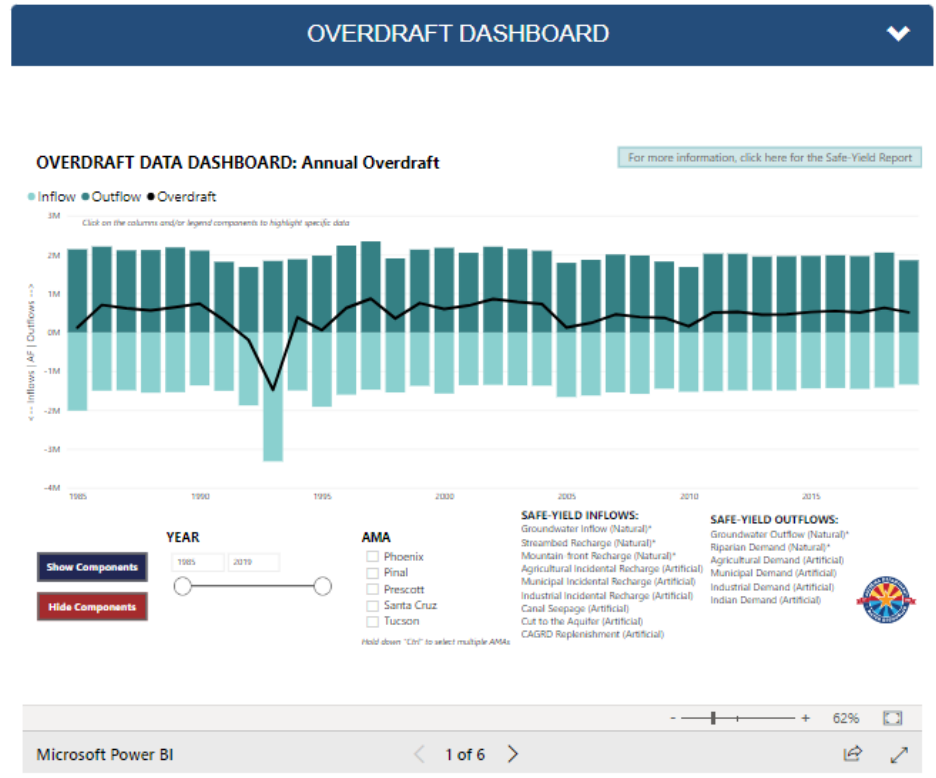


ARIZONA DEPARTMENT OF  
WATER RESOURCES

EMAIL: MANAGEMENTPLANS@AZWATER.GOV  
TEL: 602-771-8585

ADDRESS: 1110 W. WASHINGTON STREET,  
SUITE 310, PHOENIX, AZ 85007

Report available at:  
[https://new.azwater.gov/sites/default/files/media/2022\\_SYReport\\_o.pdf](https://new.azwater.gov/sites/default/files/media/2022_SYReport_o.pdf)



Source Data  
Overdraft Data Dashboard: <https://new.azwater.gov/ama/ama-data>

<https://new.azwater.gov/sites/default/files/media/TAMA5MP.pdf>

# Questions?

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[along@azwater.gov](mailto:along@azwater.gov)  
(602) 771-8420

Natalie Mast  
AMA Director - Planning  
[nlmast@azwater.gov](mailto:nlmast@azwater.gov)  
(602) 771-4646



# Meeting Agenda

1. Call to Order – Welcome & Introductions – *Chair*
2. Meeting Logistics – *Kennedy Shepard, ADWR*
3. Colorado River Update – *Rachel Von Gnechten, ADWR*  
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# *Supply & Demand*



*John Riggins*  
*Statewide Planning Manager*





*Arizona's Water Future*

**As Arizona transitions to a drier future, we  
must continue to promote a culture of  
conservation - one that enables the  
unbeatable quality of life and boundless  
opportunity we enjoy.**

---

GOVERNOR DOUG DUCEY

Signs Arizona DCP Legislation (1.31.19)

## SECURING ARIZONA'S WATER FUTURE

---

“Challenges bring opportunity. This expansion of WIFA creates an opportunity for the state to secure its water future. I want to thank Governor Ducey, the Arizona Legislature and stakeholders for coming together to collaboratively come up with this important legislation.”

TOM BUSCHATZKE  
DIRECTOR, ARIZONA DEPARTMENT OF WATER RESOURCES



# Water Supply & Demand Analysis

## A.R.S. § 45-105(B)(14)

*“Not later than December 1, 2023 and on or before December 1 of each year thereafter, prepare and issue a water supply and demand assessment for at least six of the forty-six groundwater basins established pursuant to section 45-403. The director shall ensure that a water supply and demand assessment is completed for all groundwater basins at least once every five years...”*





# Purpose of the Analysis

## A.R.S. § 49-1304

*“A. The authority shall determine the order and priority of water supply development projects proposed to be funded in whole or in part with monies from the long-term water augmentation fund, participation in projects to import water or allocation of imported water based on the following, as applicable:*

*...*

*14. Existing, near-term and long-term water demands compared to the volume and reliability of existing water supplies of the beneficiaries of the funding or project. In evaluating this criterion, the authority shall consider information contained in any applicable water supply and demand assessment that has been issued by the director of water resources pursuant to section 45-105, subsection b, paragraph 14, in addition to any other information submitted to evaluate this criterion.”*





# Previous Assessments/Studies

## DRAFT Demand and Supply Assessment

November 3

2010

This Assessment is a compilation and study of historical water demand and supply characteristics for the Phoenix AMA from the year 1985 through 2006. In addition, the Assessment calculates eight water supply and demand projection scenarios to the year 2025.

Phoenix Active  
Management  
Area

## DRAFT Demand and Supply Assessment

May 13

2011

Compilation and study of  
historical water demand and supply characteristics for  
the Pinal AMA from the year 1985 through 2006. In  
addition, the Assessment calculates seven water  
supply and demand projection scenarios to the year

Pinal Active  
Management  
Area

## DRAFT Demand and Supply Assessment

July

2012

This Assessment is a compilation and study of historical water demand and supply characteristics for the SCAMA from the year 1985 through 2009. In addition, the Assessment calculates three projected demand scenarios and compares them to statistically generated "normal" and "dry" water supply scenarios to the year 2025.

Santa Cruz  
Active  
Management  
Area

## DRAFT Demand and Supply Assessment

May 28

2010

This Assessment is a compilation and study of historical water demand and supply characteristics for the Tucson AMA from the year 1985 through 2006. In addition, the Assessment calculates seven water supply and demand projection scenarios to the year 2025.

Tucson Active  
Management  
Area

## Supply Assessment

January

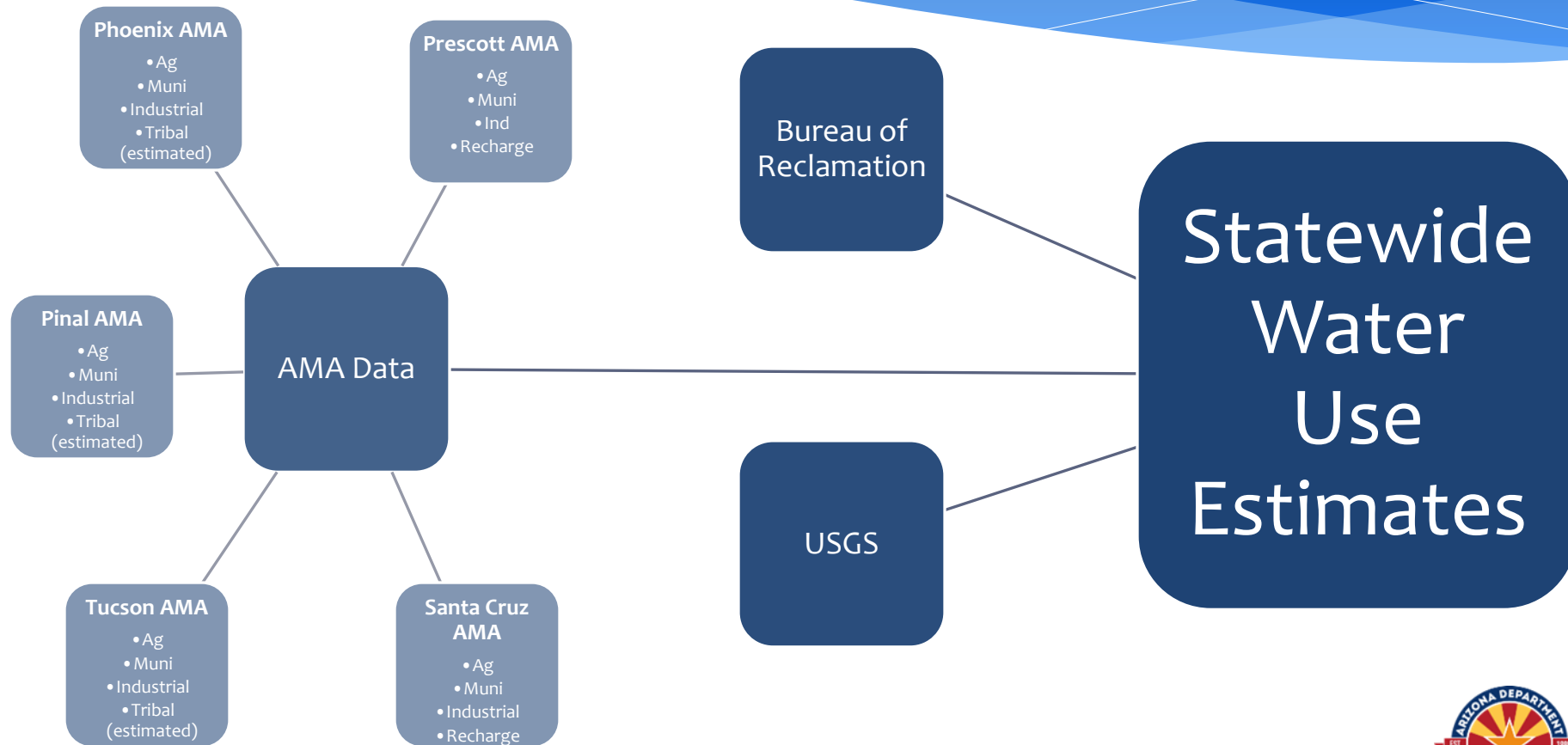
2011

This Assessment is a compilation and study of historical water demand and supply characteristics for the Prescott AMA from the year 1985 through 2006. In addition, the Assessment calculates seven water supply and demand projection scenarios to the year 2025.

Prescott Active  
Management  
Area

Source: 2010 Supply and Demand Assessments

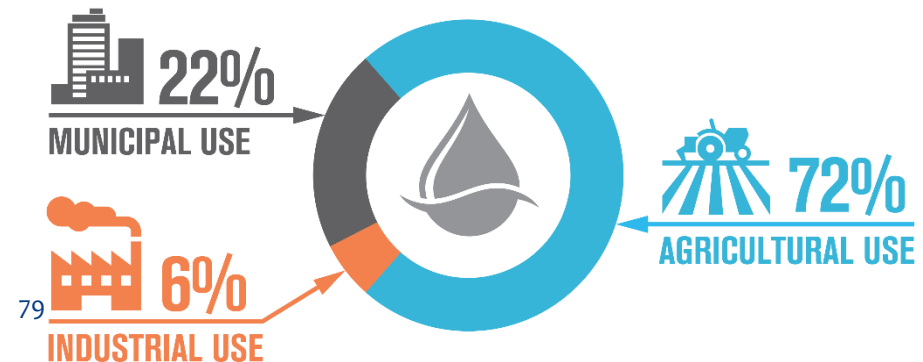
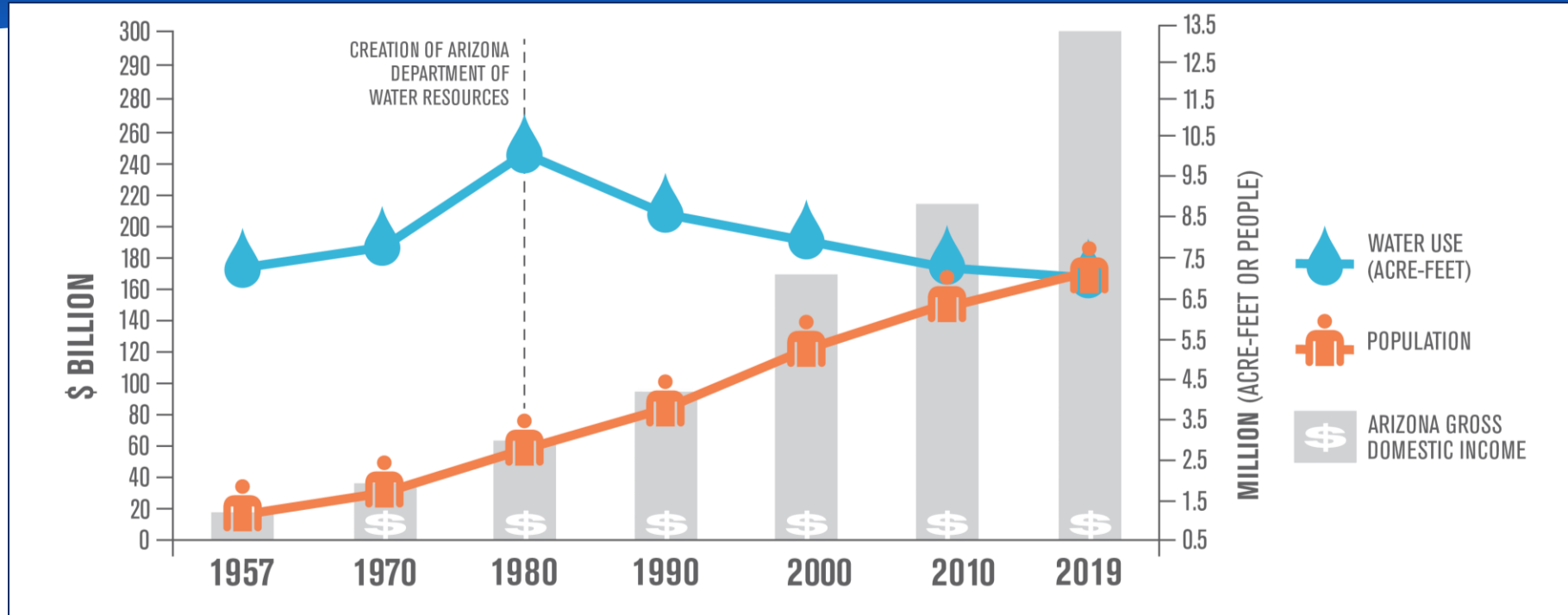
# ADWR Data Compilation





# Statewide Water Use Estimates

(2019)



# Timeline: Supply & Demand Analysis

- \* Present – December 2022
  - \* Hiring/Training Staff
  - \* Developing initial datasets
  - \* Developing initial assumptions
  - \* Identify initial basins for analysis
- \* CY 2023
  - \* Analyses for initial basins
  - \* Reports due December 1, 2023 (and December 1 of each year thereafter)





# Considerations for Scenarios & Assumptions

## Supply

- \* Treatment of water types/categories
  - \* Source
  - \* Current Utilization
  - \* Additional Supply
- \* Definition of Imbalance
- \* Shortage Scenarios

## Demand

- \* Treatment of Various Sectors/Water Uses
  - \* Data availability
  - \* Methods for estimates
- \* Impact of Conservation Programs and/or Curtailments
- \* Impact of Population Change



*“In Arizona, we’re going to have to make tough policy choices about water management. We’ll have to make choices about which aspects of our lifestyle we can give up and which we will maintain.”*

ADWR Director Tom Buschatzke



# Questions?

**John Riggins**  
**Statewide Planning Manager**

Phone: 602-771-8742

Email: [jrriggins@azwater.gov](mailto:jrriggins@azwater.gov)



**PROTECTING**  
**ARIZONA'S WATER SUPPLIES**  
*for* **CURRENT & FUTURE GENERATIONS**

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